

Serial No. 10/077,639  
Docket No. NEC 01FN073  
Amendment E under Rule 116

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**AMENDMENTS TO THE CLAIMS:**

Kindly amend claims 12 and 13, as shown below.

This listing of claims will replace all prior versions and listings of claims in the Application.

**Claim 1 (previously presented):** An optical disk device for recording or reproducing information on an optical disk with a recording layer formed on a transparent substrate, comprising:

an objective lens for condensing light for recording or reproducing information on said recording layer via a transparent substrate of the optical disk;

a signal detector for detecting a focus error signal from all rays of return light reflecting from said recording layer; and

a thickness error detector for detecting a thickness error of said transparent substrate with reference to a specified value or its sign, based on a difference between the absolute value of the positive peak of said focus error signal and the absolute value of the negative peak of said focus error signal.

**Claim 2 (previously presented):** An optical disk device for recording or reproducing information on an optical disk with a recording layer formed on a transparent substrate, comprising:

an objective lens for condensing light for recording or reproducing information on said recording layer via a transparent substrate of the optical disk;

a signal detector for detecting a focus error signal and a sum signal from all rays of return light reflecting from said recording layer; and

a thickness error detector for detecting a thickness error of said transparent substrate with reference to a specified value or its sign, based on a difference between the focus position

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of the peak point of said sum signal and the focus position of the zero point of said focus error signal.

**Claims 3 and 4 (cancelled)**

**Claim 5 (previously presented):** The optical disk device described in Claim 14, wherein

said signal detector detects said focus error signals and said focus sum signals by means of the spot size method; and

said thickness error detector detects the thickness error of said transparent substrate or its symbol based on differences in the absolute value between the positive peak and negative peak of said focus error signals.

**Claim 6 (previously presented):** The optical disk device described in Claim 15, wherein

said signal detector detects said focus error signals and said focus sum signals by means of the spot size method; and

said thickness error detector detects the thickness error of said transparent substrate or its symbol based on differences between the peak point of said focus sum signal and the zero point of said focus error signal in their focus positions.

**Claim 7 (previously presented):** The optical disk device described in Claim 14, wherein

said signal detector detects said focus error signals and said focus sum signals by means of the astigmatism method; and

said thickness error detector detects the thickness error of said transparent substrate based on focus pull-in range which is the distance between the positive peak and negative peak of said focus error signals.

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**Claim 8 (original):** The optical disk device described in Claim 7, wherein  
said thickness error detector detects the thickness error symbols of said transparent  
substrate and its symbol by means of detecting absolute amount of the thickness error of said  
transparent substrate from said focus pull-in range and compares waveforms of the positive  
peak vicinity with waveforms of the negative peak vicinity of said focus error signals.

**Claim 9 (previously presented):** The optical disk device described in Claim 15,  
wherein

said signal detector detects said focus error signals and said focus sum signals by  
means of the astigmatism method; and

said thickness error detector detects the thickness error of said transparent substrate  
and its symbol based on differences between the peak point of said focus sum signal and the  
zero point of said focus error signal.

**Claim 10 (previously presented):** The optical disk device described in Claim 1,  
further comprising:

a spherical aberration compensator for compensating for spherical aberration caused  
by the thickness error of said transparent substrate.

**Claim 11 (previously presented):** The optical disk device described in Claim 2,  
further comprising:

a spherical aberration compensator for compensating for spherical aberration caused  
by the thickness error of said transparent substrate.

**Claim 12 (currently amended):** The optical disk device ~~described in Claim 10, An~~  
optical disk device for recording or reproducing information on an optical disk with a recording  
layer formed on a transparent substrate, comprising:

an objective lens for condensing light for recording or reproducing information on said

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recording layer via a transparent substrate of the optical disk;

a signal detector for detecting a focus error signal from all rays of return light

reflecting from said recording layer;

a thickness error detector for detecting a thickness error of said transparent substrate

with reference to a specified value or its sign, based on a difference between the absolute value

of the positive peak of said focus error signal and the absolute value of the negative peak of

said focus error signal; further comprising:

a spherical aberration compensator for compensating for spherical aberration caused

by the thickness error of said transparent substrate; and

a controller for calculating a compensating amount for said spherical aberration at each radial position of said optical disk based on a thickness error of said transparent substrate detected at said radial position of said optical disk prior to recording or reproducing information, and driving said spherical aberration compensator to compensate for said spherical aberration based on said compensation amount during recording or reproduction of said optical disk.

Claim 13 (currently amended): The optical disk device described in Claim 11, An optical disk device for recording or reproducing information on an optical disk with a recording layer formed on a transparent substrate, comprising:

an objective lens for condensing light for recording or reproducing information on said recording layer via a transparent substrate of the optical disk;

a signal detector for detecting a focus error signal and a sum signal from all rays of return light reflecting from said recording layer;

a thickness error detector for detecting a thickness error of said transparent substrate

with reference to a specified value or its sign, based on a difference between the focus position

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of the peak point of said sum signal and the focus error signal, further comprising:

a spherical aberration compensator for compensating for spherical aberration caused by the thickness error of said transparent substrate; and

a controller for calculating a compensating amount for said spherical aberration at each radial position of said optical disk based on a thickness error of said ~~optical disk based on a thickness error of said~~ transparent substrate detected at said radial position of said optical disk prior to recording or reproducing information, and driving said spherical aberration compensator to compensate for said spherical aberration based on said compensation amount during recording or reproduction of said optical disk.

**Claim 14 (previously presented):** An optical disk device for recording or reproducing information on an optical disk with a recording layer formed on a transparent layer, comprising:

an objective lens for condensing light for recording or reproducing information on said recording layer via a transparent substrate of the optical disk;

a signal detector for detecting a focus error signal and a focus sum signal from return light reflecting from said recording layer;

a thickness error detector for detecting a thickness error of said transparent substrate with reference to a specified value, based on the characteristics of said focus error signal;

a spherical aberration compensator for compensating for spherical aberration caused by the thickness error of said transparent substrate placed on an optical path of said signal detector; and

a controller for calculating a compensating amount for said spherical aberration at each radial position of said optical disk based on a thickness error of said transparent substrate detected at said radial position of said optical disk prior to recording or reproducing

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information, and driving said spherical aberration compensator to compensate for said spherical aberration based on said compensation amount during recording or reproduction of said optical disk.

**Claim 15 (previously presented):** An optical disk device for recording or reproducing information on an optical disk with a recording layer formed on a transparent substrate, comprising:

an objective lens for condensing light for recording or reproducing information on said recording layer via a transparent substrate of the optical disk;

a signal detector for detecting a focus error signal and a focus sum signal from return light reflecting from said recording layer; and

a thickness error detector for detecting a thickness error of said transparent substrate with reference to a specified value, based on the peak position of said focus sum signal;

a spherical aberration compensator for compensating for spherical aberration caused by the thickness error of said transparent substrate placed on an optical path of said signal detector; and

a controller for calculating a compensating amount for said spherical aberration at each radial position of said optical disk based on a thickness error of said transparent substrate detected at said radial position on the optical disk prior to recording or reproducing information, and driving said spherical aberration compensator to compensate for said spherical aberration based on said compensation amount during recording or reproduction of said optical disk.

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